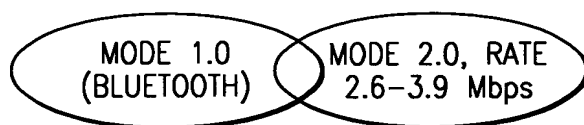


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| MODE | DATA RATE (Mbps) | TARGET APPLICATION | RECEIVER SENSITIVITY | POWER CONSUMPTION ('2001) | |
|-------------------------|---------------------|--------------------------------|-------------------------|---------------------------|------------|
| | | | | Rx AVERAGE | Tx AVERAGE |
| MODE 1.0 (BLUETOOTH) | 1 Mbps | | -84 dBm | 25 mW | 15 mW |
| MODE 2.0 | 2.6-3.9 Mbps | AUDIO | -78 dBm | 30 mW | 20 mW |
| MODE 3.0 | 22-44 Mbps | VIDEO, COMPUTER GRAPHICS | -69 dBm | 95 mW | 60 mW |

FIG. 1

CONFIGURATION 1:
AUDIO AND INTERNET
STREAMING APPLICATIONS



CONFIGURATION 2:
VIDEO, COMPUTER
GRAPHICS

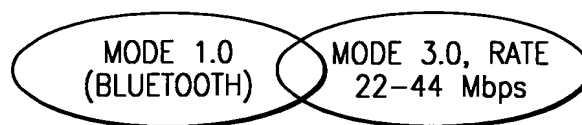


FIG. 2

| FREQUENCY OFFSET | TRANSMIT POWER |
|------------------|----------------|
| +/- 550 kHz | -20 dBc |
| $ M-N =2$ | -20 dBm |
| $ M-N \geq 3$ | -40 dBm |

FIG. 4

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FOE240" E027760

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| PARAMETERS | MODE 1 (BLUETOOTH) | MODE 2 |
|------------------------------|-----------------------|--|
| FREQUENCY HOPPING | 1600 Hz | SAME AS BLUETOOTH |
| FILTER SPECTRUM | | SAME AS BLUETOOTH |
| MODULATION | GFSK | 16, 64 QAM |
| MAXIMUM DATA RATE | 1 Mbps | 2.6, 3.9 Mbps |
| ACQUISITION | | USING MODE 1 THEN SWITCH TO MODE 2 |
| TRANSMIT POWER | 0 dBm | 0 dBm, 6 dBm |
| DISTANCE | 10 m | 10 m |
| NOMINAL PACKET ERROR RATE | 10% | 10% |
| MARGIN + NOISE FIGURE | 37 dB | 37 dB |
| RECEIVER SENSITIVITY | -84 dBm | -84, -78 dBm |
| CODING | ARQ | ARQ + CONVOLUTIONAL CODE ACROSS PACKETS |

FIG. 3

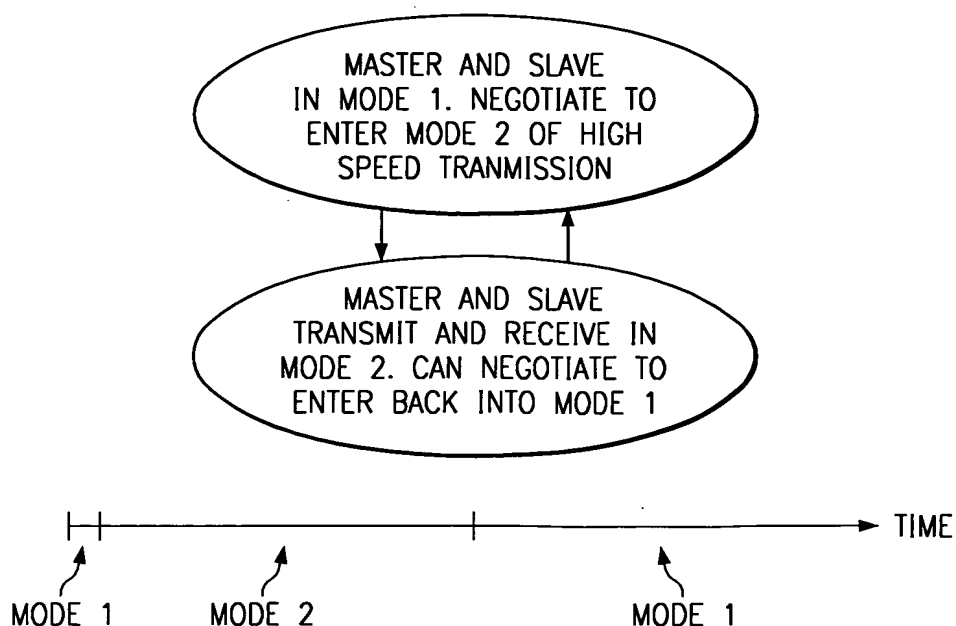


FIG. 5

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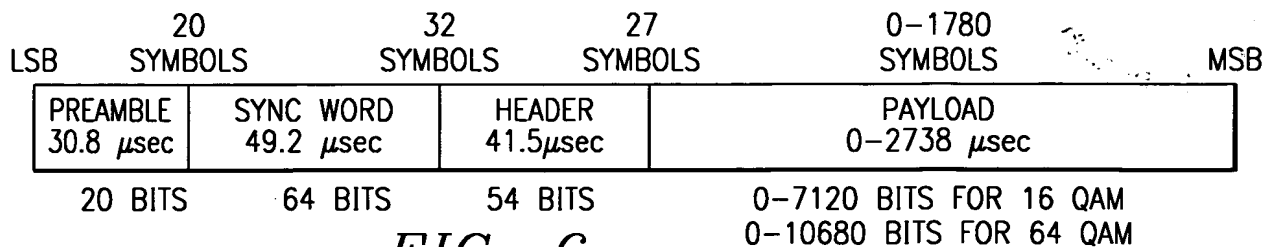


FIG. 6

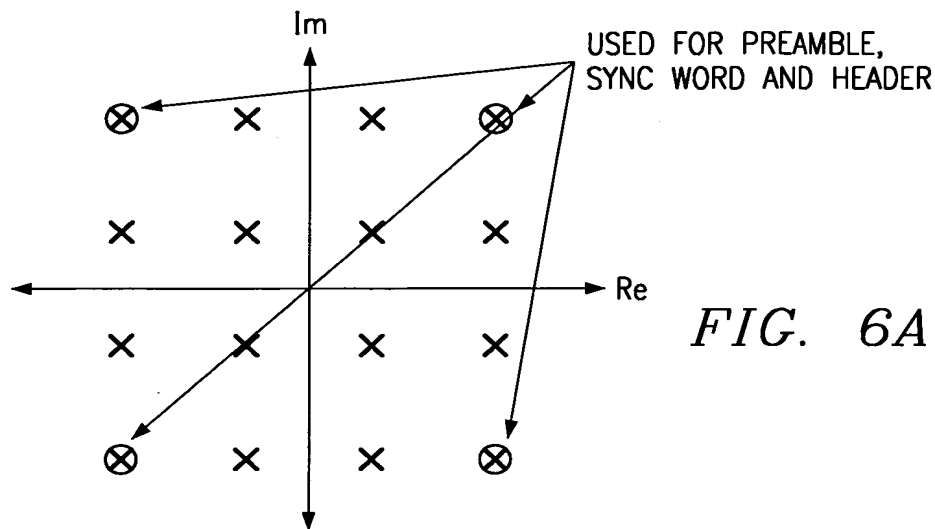


FIG. 6A

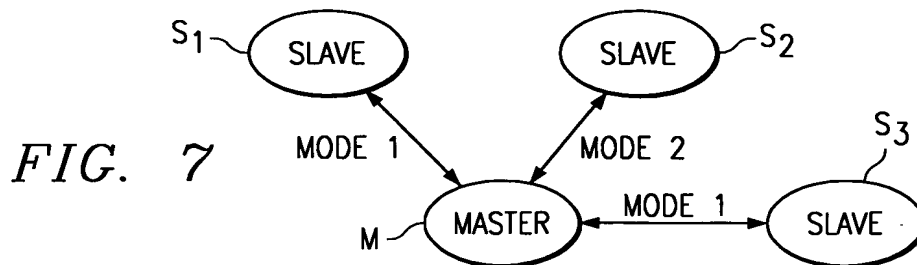


FIG. 7

| | | | | | | | | | | | |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| M | S ₁ | M | S ₂ | M | S ₃ | M | S ₁ | M | S ₂ | M | S ₃ |
| MODE 1 | MODE 1 | MODE 2 | MODE 2 | MODE 1 | MODE 1 | MODE 1 | MODE 1 | MODE 2 | MODE 2 | MODE 1 | MODE 1 |

FIG. 8

TIME →

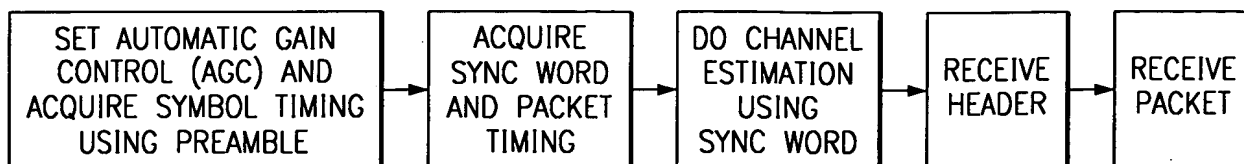


FIG. 9

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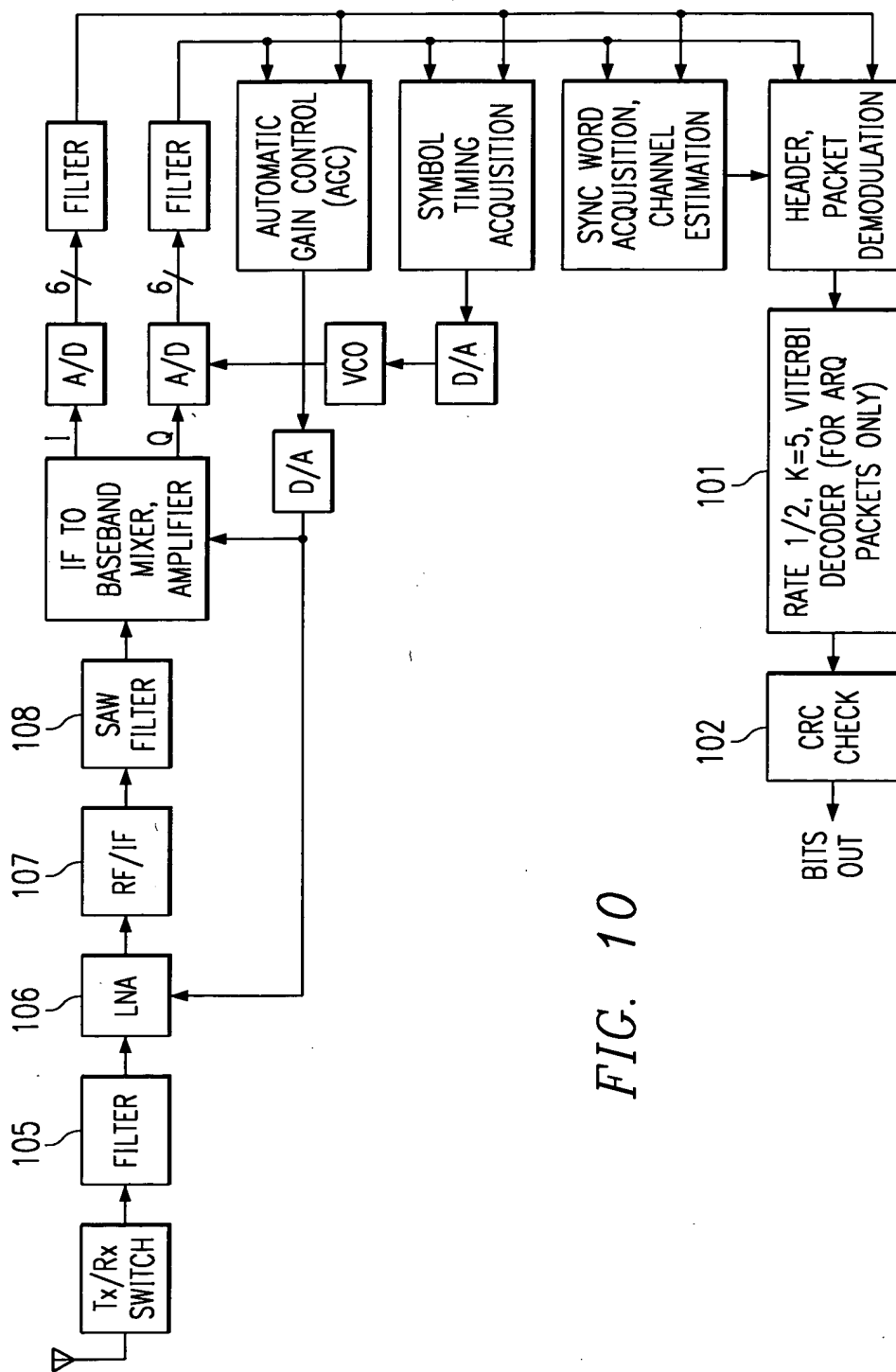


FIG. 10

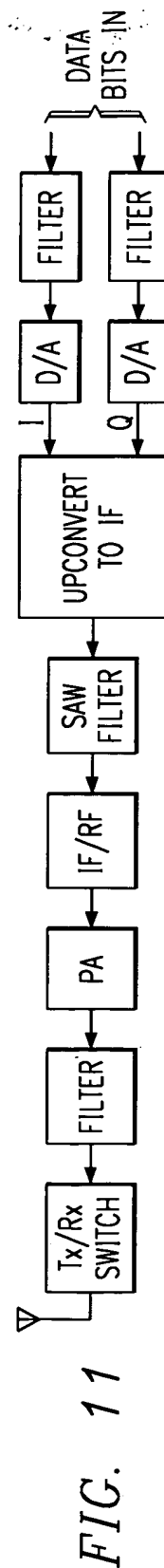
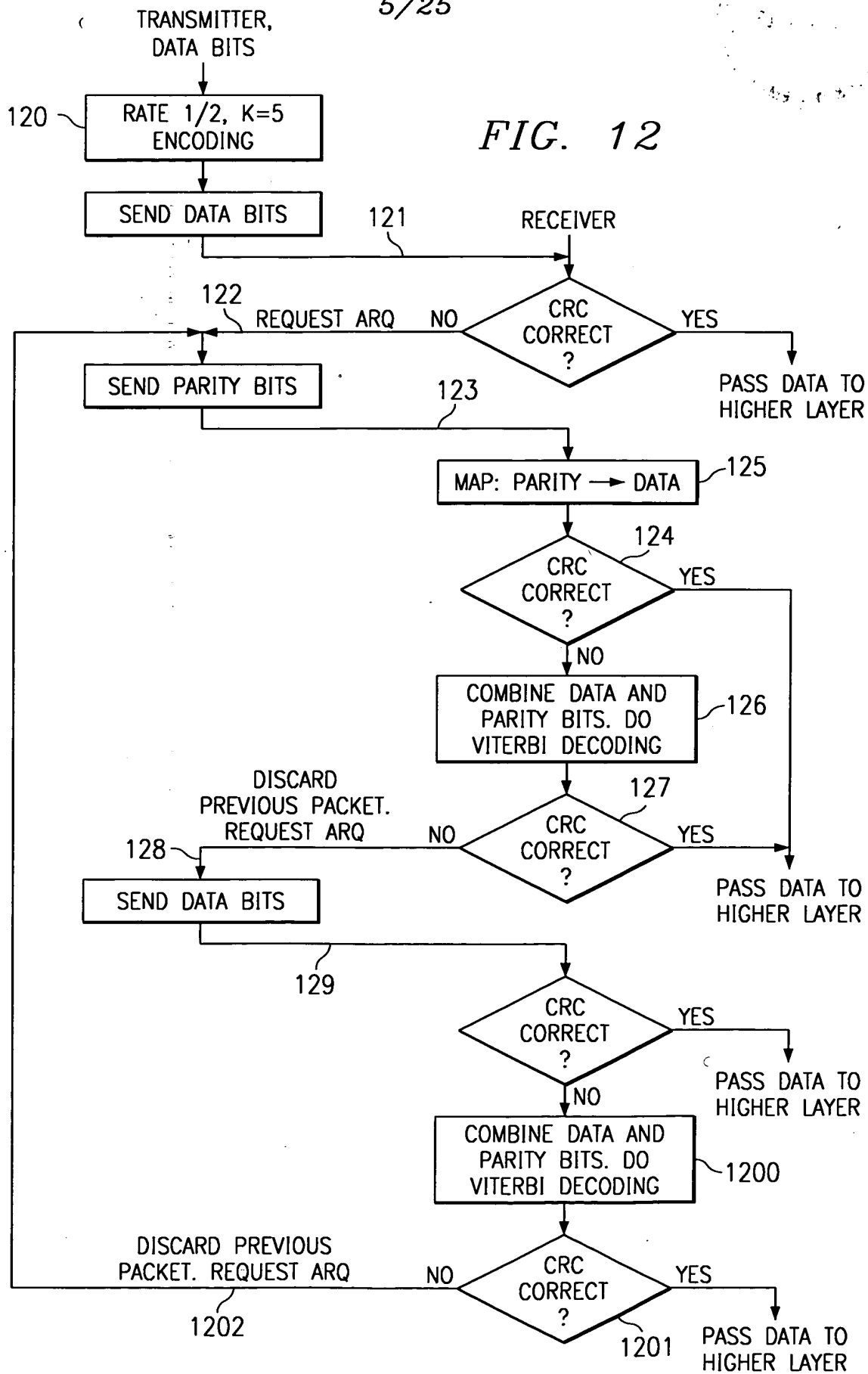
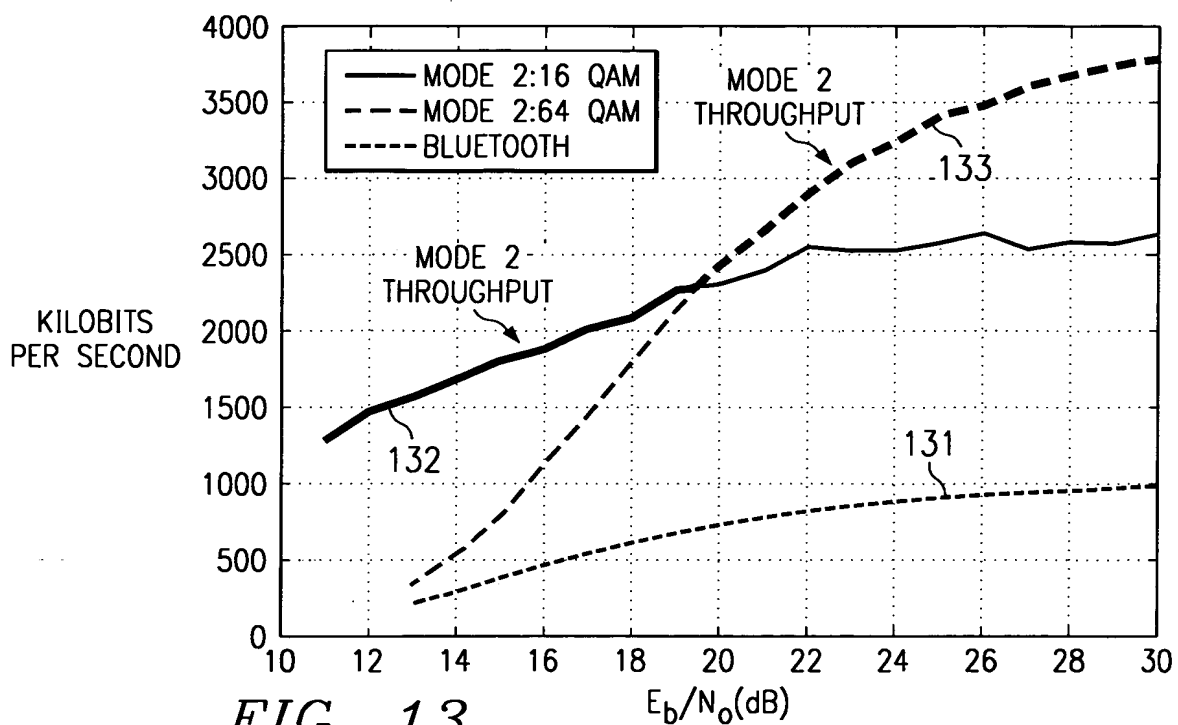
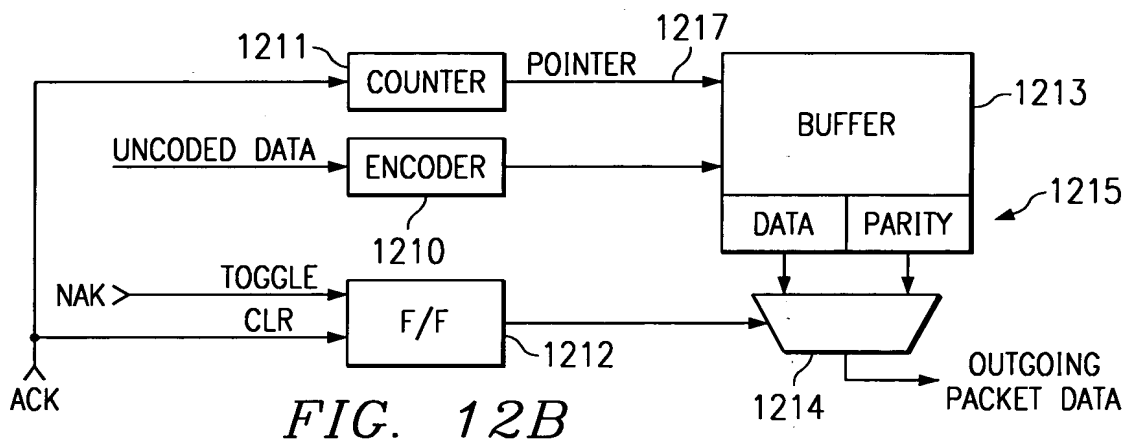
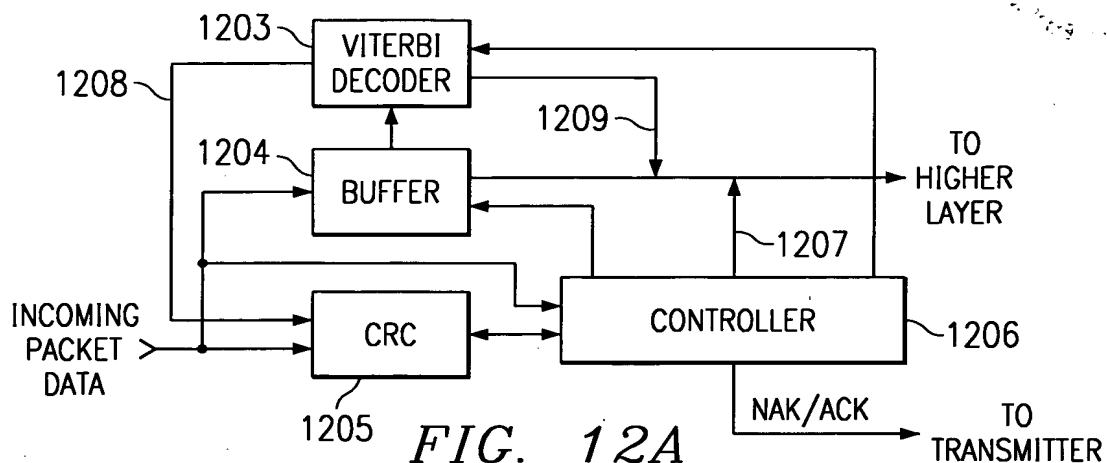


FIG. 11



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| PARAMETERS | 1 | 2 | 3 | 4 | 5 |
|------------------------|------------------------|----------------|------------------------|------------------------|----------------|
| FILTER SPECTRUM | 802.11b | 802.11b | 802.11b | 802.11b | 802.11b |
| MODULATION | QPSK | QPSK | 16 QAM | 16 QAM | 16 QAM |
| SCRAMBLING CODE LENGTH | 256 | 256 | 256 | 256 | 256 |
| PHYSICAL DATA RATE | 22 Mbps | 22 Mbps | 44 Mbps | 44 Mbps | 44 Mbps |
| CODING | RATE 1/2, TURBO (SCCC) | NONE | RATE 1/2, TURBO (SCCC) | RATE 3/4, TURBO (SCCC) | NONE |
| ARQ | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL |
| MAXIMUM DATA RATE | 11 Mbps | 22 Mbps | 22 Mbps | 33 Mbps | 44 Mbps |
| TRANSMIT POWER | -1 dBm | 8 dBm | 4 dBm | 8 dBm | 15 dBm |
| DISTANCE | 10 m | 10 m | 10 m | 10 m | 10 m |
| BIT ERROR RATE | 1e-8 | 1e-8 | 1e-8 | 1e-8 | 1e-8 |
| PACKET ERROR RATE | 1e-4 | 1e-4 | 1e-4 | 1e-4 | 1e-4 |
| MARGIN + NOISE FIGURE | 37 dB | 37 dB | 37 dB | 37 dB | 37 dB |
| RECEIVER SENSITIVITY | -85 dBm | -76 dBm | -80 dBm | -76 dBm | -69 dBm |
| FREQUENCY DIVERSITY | BAND SELECTION | BAND SELECTION | BAND SELECTION | BAND SELECTION | BAND SELECTION |
| SYMBOL RATE | 11 Msps | 11 Msps | 11 Msps | 11 Msps | 11 Msps |
| SPREADING | 11 Mcps | 11 Mcps | 11 Mcps | 11 Mcps | 11 Mcps |

FIG. 14

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| | MAXIMUM DATA RATE | MODULATION | SYMBOL RATE | CODING | SPREADING |
|----|----------------------|------------|----------------|----------|---------------|
| 18 | 18 Mbps | QPSK | 18 Msps | RATE 1/2 | 18 Mchips/sec |
| 19 | 36 Mbps | QPSK | 18 Msps | RATE 1 | 18 Mchips/sec |
| 20 | 36 Mbps | 16 QAM | 18 Msps | RATE 1/2 | 18 Mchips/sec |
| 21 | 54 Mbps | 16 QAM | 18 Msps | RATE 3/4 | 18 Mchips/sec |
| 22 | 72 Mbps | 16 QAM | 18 Msps | RATE 1 | 18 Mchips/sec |

FIG. 14A

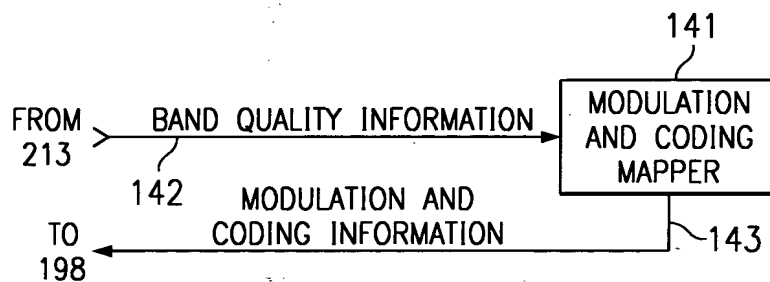


FIG. 14B

| PARAMETERS | 6 | 7 | 8 | 9 | 10 |
|------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| FILTER SPECTRUM | 802.11b | 802.11b | 802.11b | 802.11b | 802.11b |
| MODULATION | QPSK | QPSK | QPSK | QPSK | QPSK |
| SCRAMBLING CODE LENGTH | 256 | 256 | 256 | 256 | 256 |
| PHYSICAL DATA RATE | 22 Mbps | 22 Mbps | 22 Mbps | 22 Mbps | 22 Mbps |
| CODING | RATE 1/2, TURBO | RATE 2/3, TURBO | RATE 3/4, TURBO | RATE 4/5, TURBO | RATE 5/6, TURBO |
| ARQ | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL |
| MAXIMUM DATA RATE | 11 Mbps | 14.67 Mbps | 16.5 Mbps | 17.6 Mbps | 18.33 Mbps |

FIG. 14C

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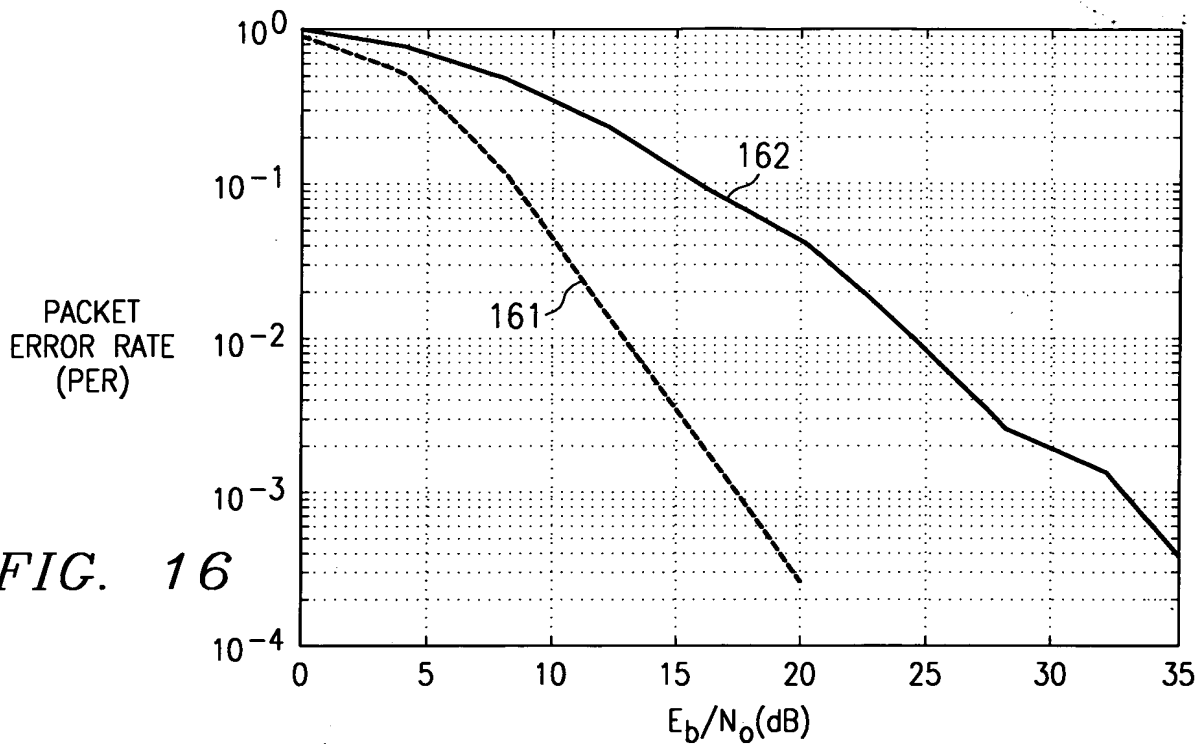
| PARAMETERS | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|------------------------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| FILTER SPECTRUM | 802.11b | 802.11b | 802.11b | 802.11b | 802.11b | 802.11b | 802.11b |
| MODULATION | 8-PSK | 8-PSK | 8-PSK | 8-PSK | 8-PSK | 8-PSK | 8-PSK |
| SCRAMBLING CODE LENGTH | 256 | 256 | 256 | 256 | 256 | 256 | 256 |
| PHYSICAL DATA RATE | 33 Mbps | 33 Mbps | 33 Mbps | 33 Mbps | 33 Mbps | 33 Mbps | 33 Mbps |
| CODING | NONE | RATE 1/3, TURBO | RATE 1/2, TURBO | RATE 2/3, TURBO | RATE 3/4, TURBO | RATE 4/5, TURBO | RATE 5/6, TURBO |
| ARQ | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL |
| MAXIMUM DATA RATE | 33 Mbps | 11 Mbps | 16.5 Mbps | 22 Mbps | 24.75 Mbps | 26.4 Mbps | 27.5 Mbps |

FIG. 14D

| FREQUENCY OFFSET | TRANSMIT POWER |
|------------------|----------------|
| f_c | 0 dBc |
| +/- 11 MHz | -30 dBc |
| +/- 22 MHz | -50 dBm |

FIG. 15

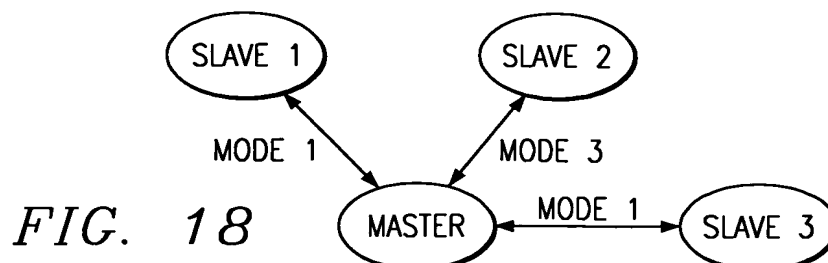
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SYSTEM IN MODE 1 (BLUETOOTH 1.0) FOR 25 ms
SEARCHES FOR GOOD FREQUENCIES FOR 7.5 msec
COMMUNICATION WITH OTHER BLUETOOTH DEVICES, 17.5 msec

FIG. 17

SYSTEM IN MODE 3 ACHIEVES HIGH DATA
TRANSMISSION ON ONE OF THE GOOD 22 MHz
BANDS SELECTED IN MODE 1. REVERT TO
MODE 1 AFTER 225 ms TO FIND A NEW GOOD
FREQUENCY AND COMMUNICATE WITH OTHER
BLUETOOTH DEVICES



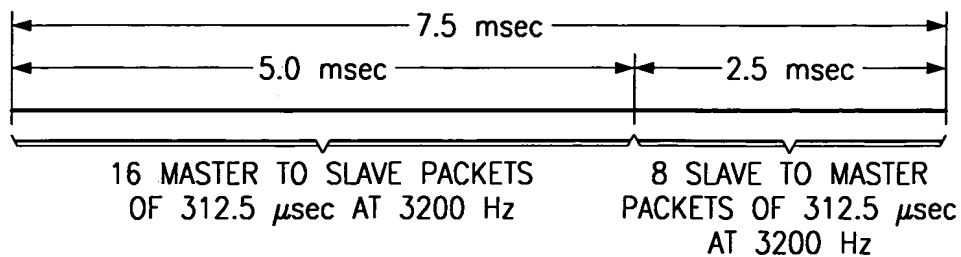
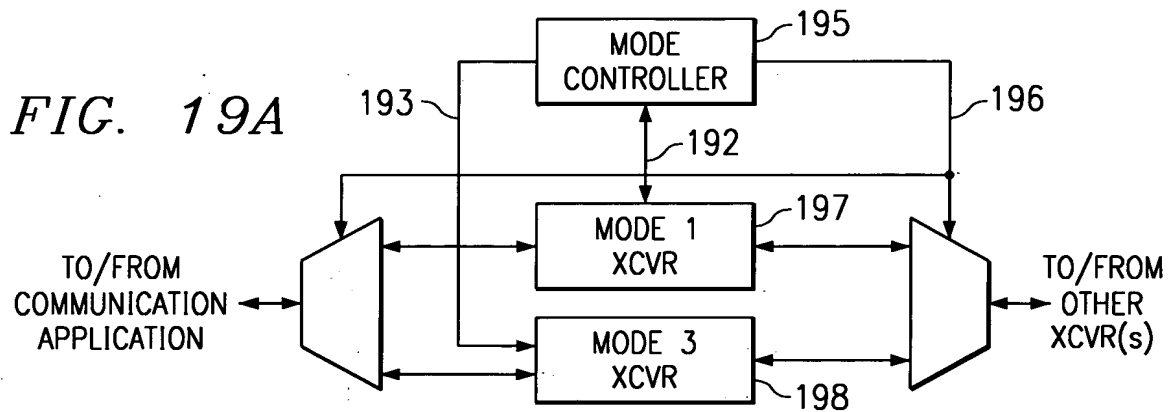
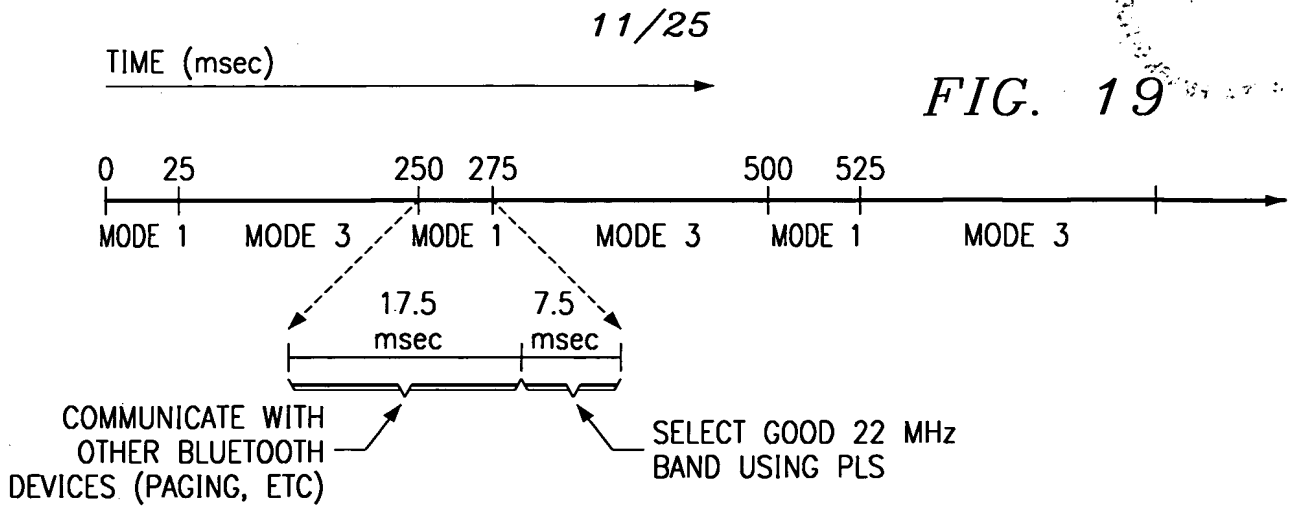


FIG. 21

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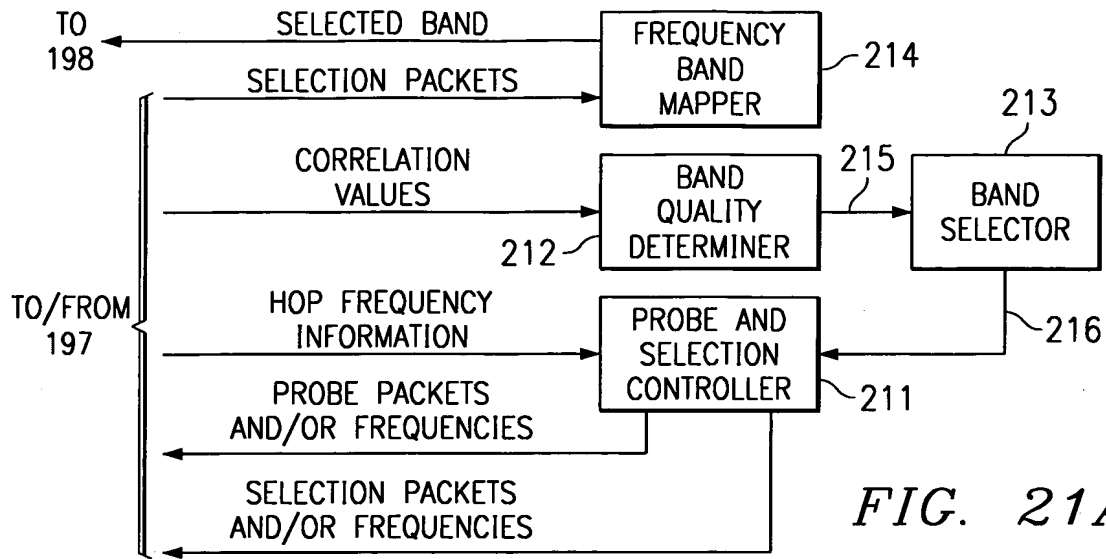


FIG. 21A

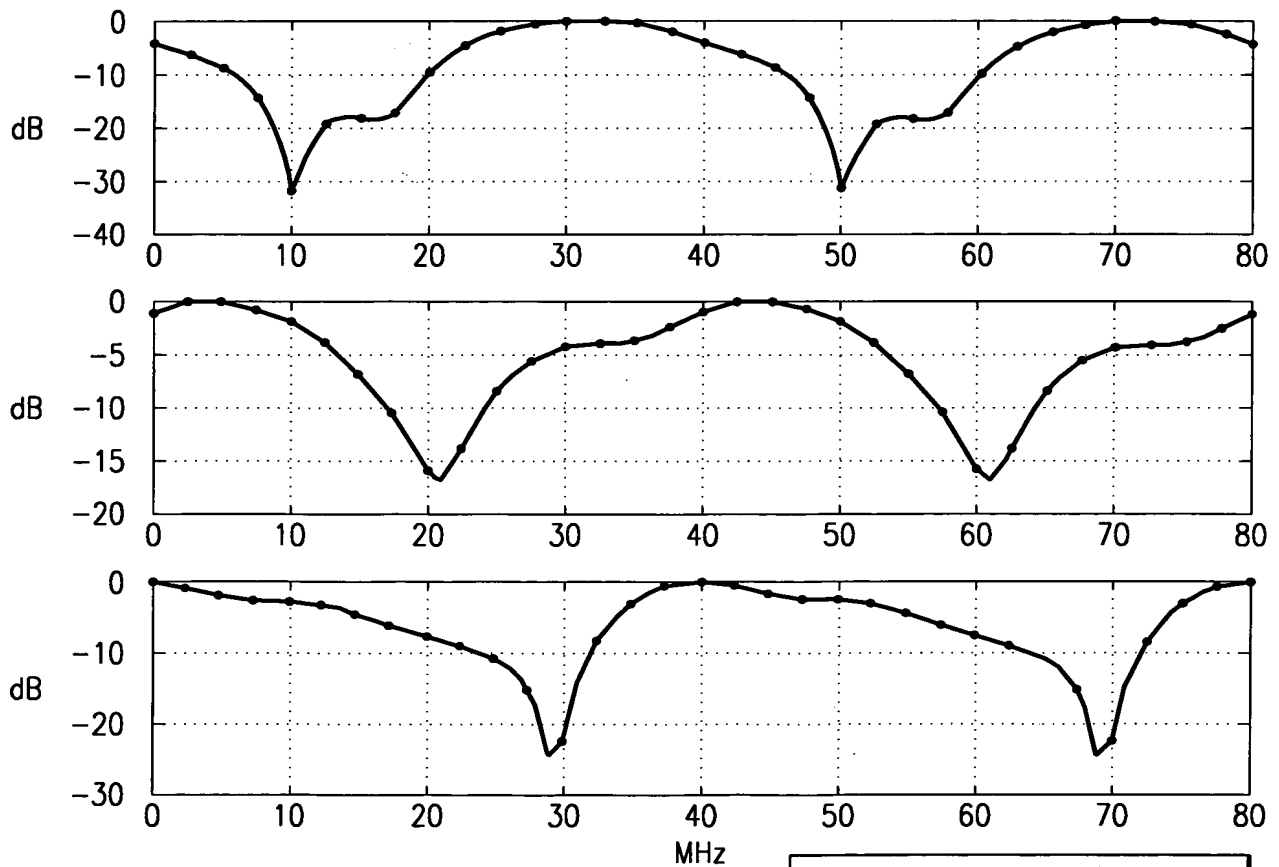


FIG. 23

• PLS SAMPLED RESPONSE
— ACTUAL RESPONSE

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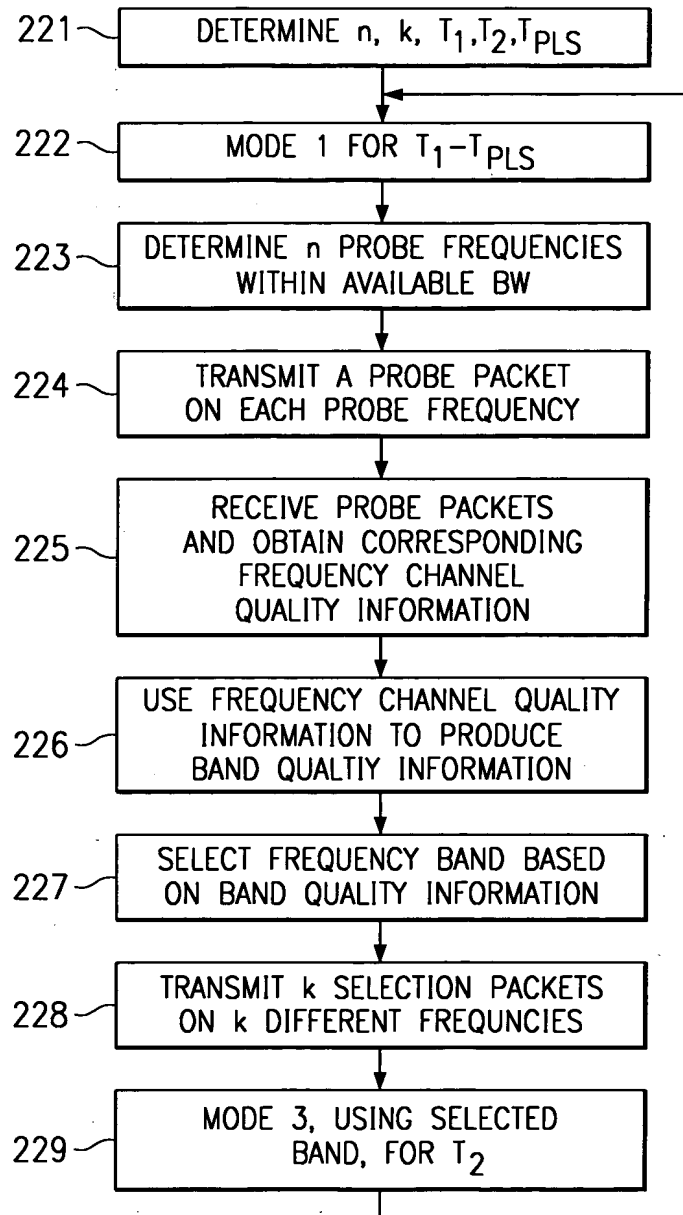


FIG. 21B

| | | |
|--------------------|------------------------|--|
| PREAMBLE 4 BITS | ACCESS CODE 64 BITS | CHANNEL EDGE FREQUENCY INDEX 6*3=18 BITS |
|--------------------|------------------------|--|

FIG. 22

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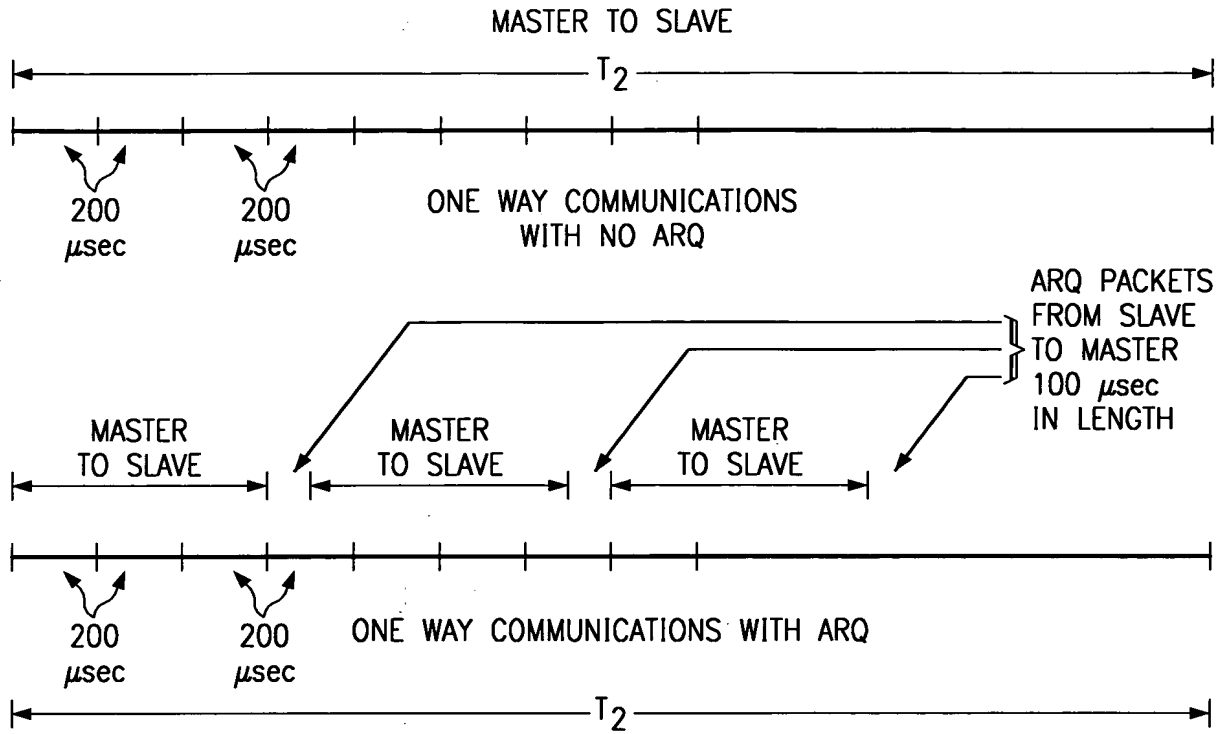


FIG. 24

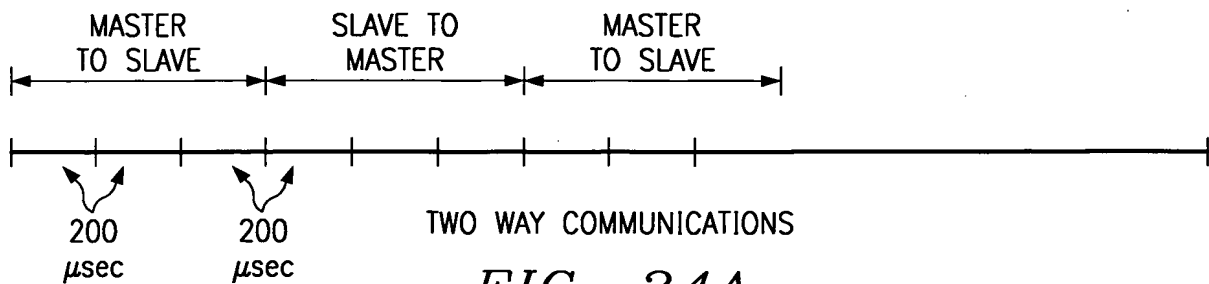
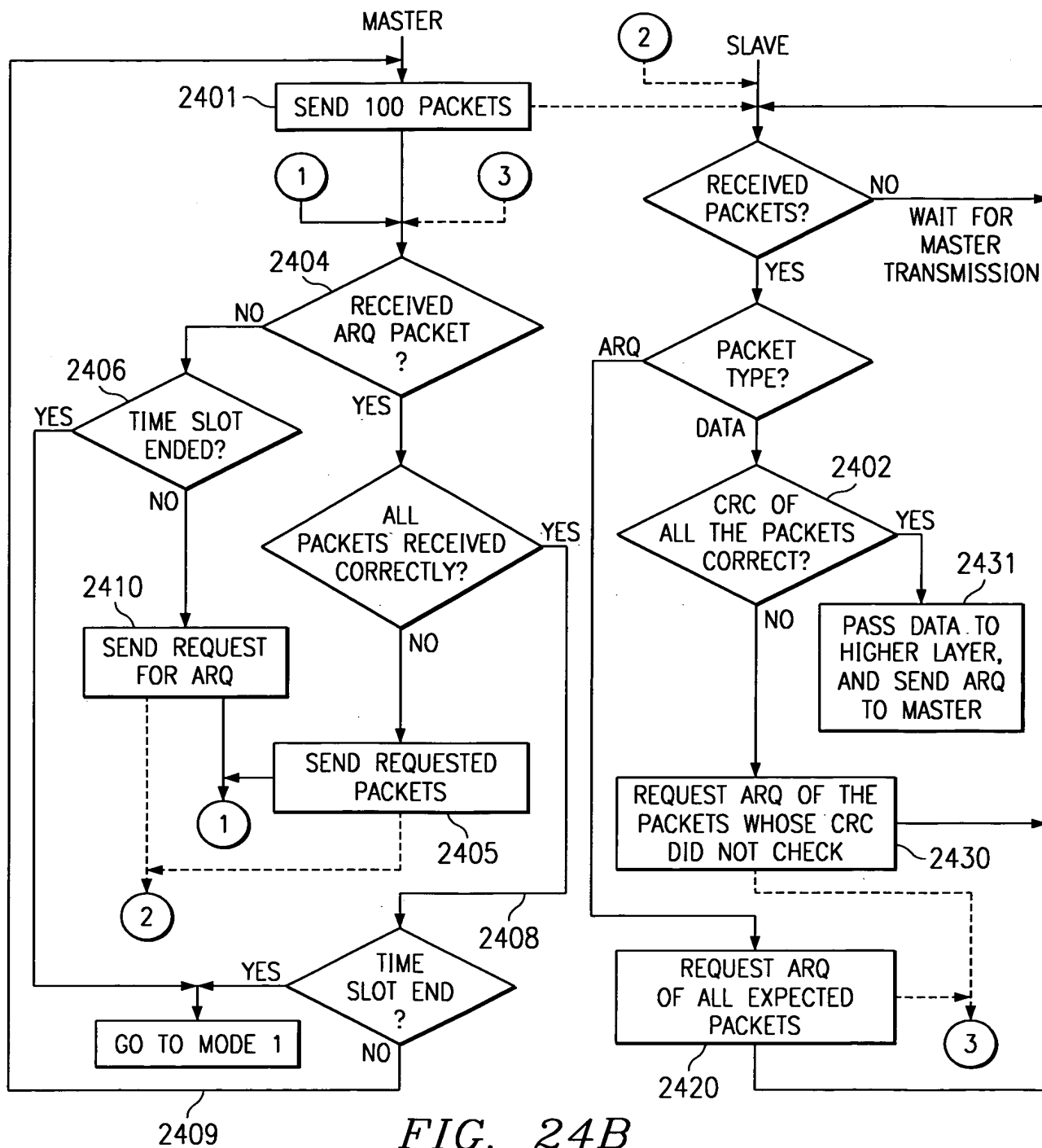


FIG. 24A

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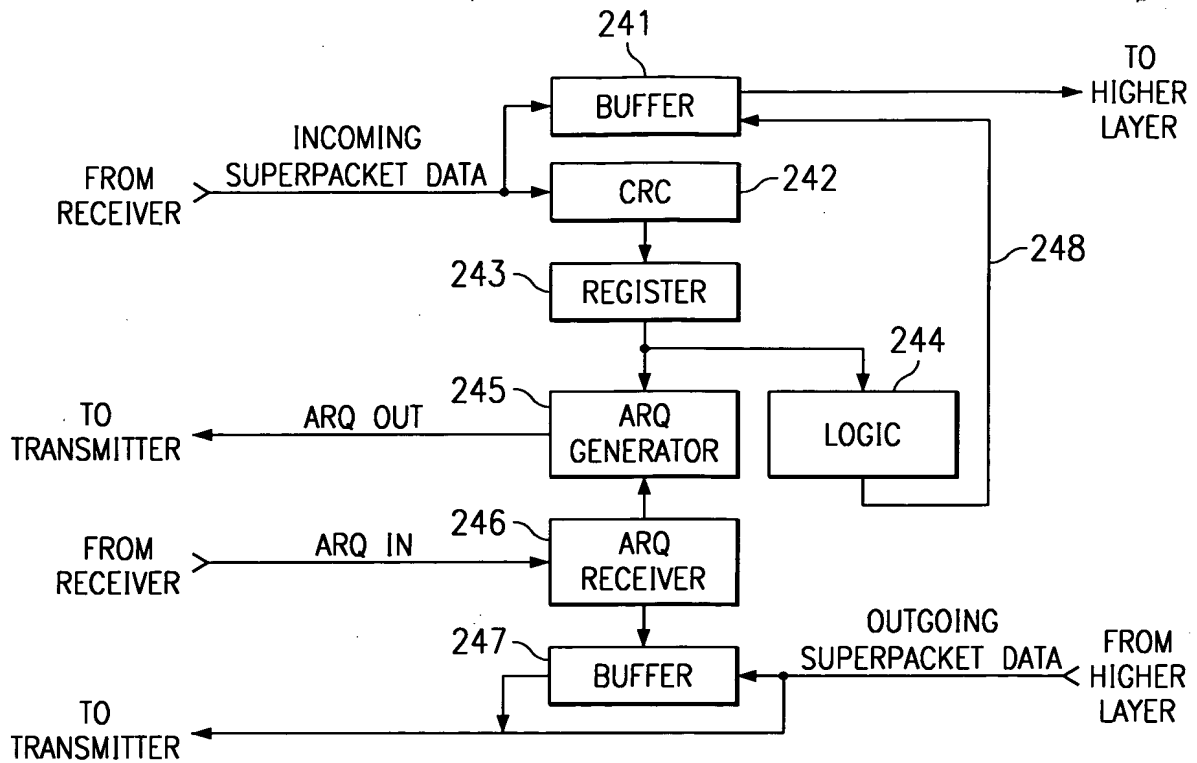


FIG. 24C

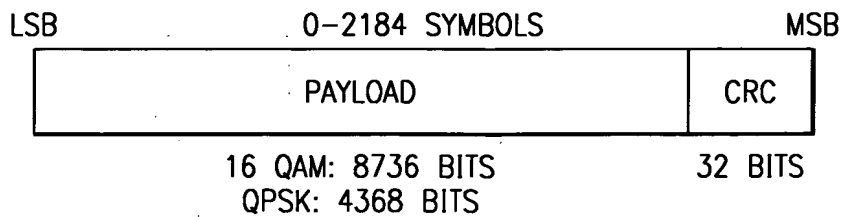


FIG. 25

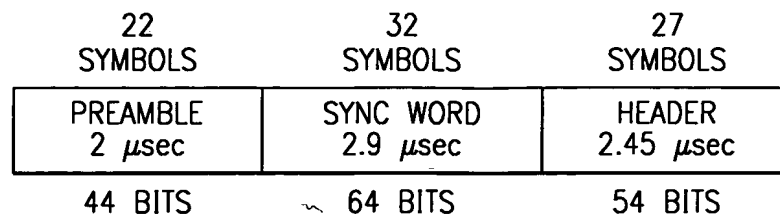


FIG. 26

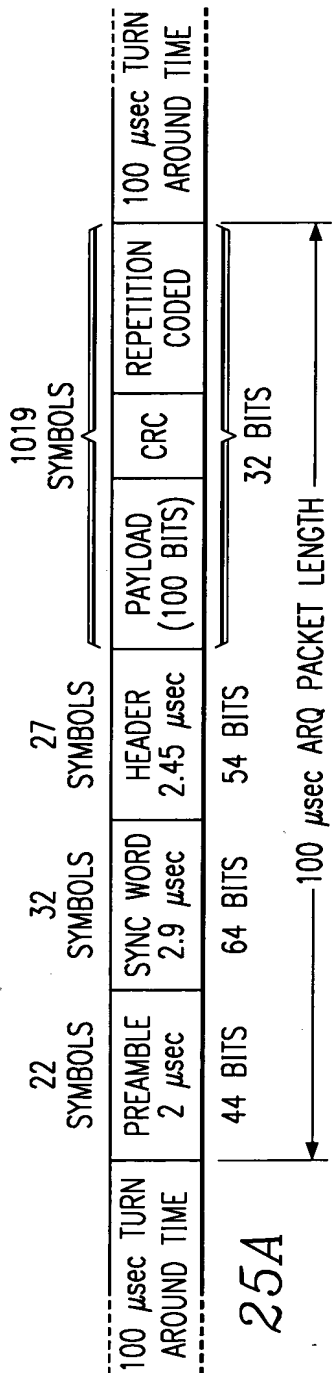


FIG. 25A

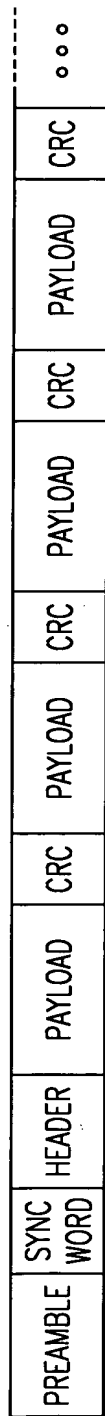


FIG. 27

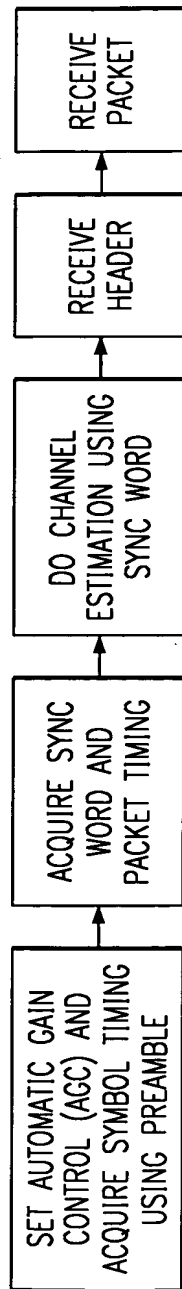


FIG. 29

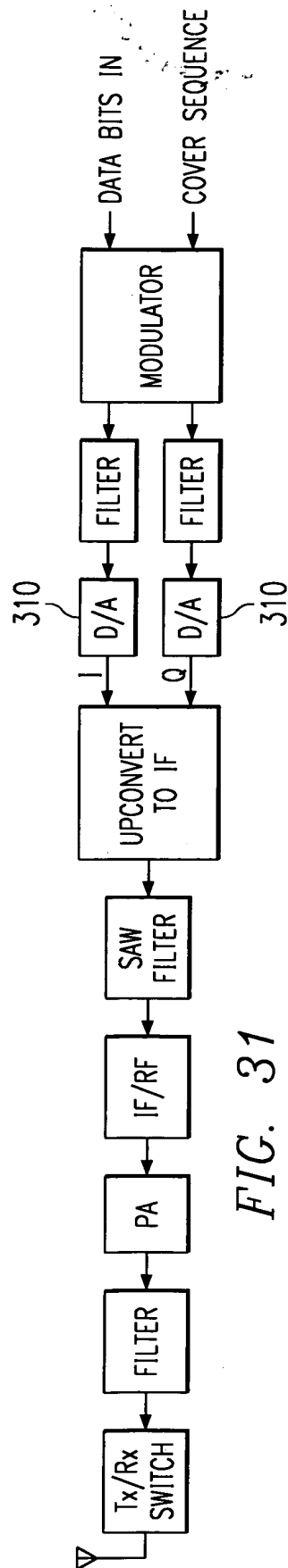


FIG. 31

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| MPEG2 HDTV VIDEO TRANSMISSION USING MODE 3 | |
|---|------------------------------------|
| VIDEO DATA RATE | 18 Mbps |
| VIDEO FRAMES/SEC | 24 |
| VIDEO FRAMES/MODE 3 SLOT | 6 |
| MODE 3 DATA RATE | 44 Mbps, 11 MSPS |
| CODING | RATE 1/2, TURBO |
| MODULATION | 16 QAM |
| TIME IN BLUETOOTH MODE (T_1 msec) | 25 msec |
| TIME IN BLUETOOTH MODE FOR OTHER DEVICES | 17.5 msec |
| TIME IN BLUETOOTH MODE FOR PAL | 7.5 msec |
| SLOT TIME IN MODE 3 (T_2 msec) | 225 msec |
| MODE 3 PACKET SIZE | 4.4 Kbits |
| DATA BITS/PACKET | 4368 |
| CRC BITS/PACKET | 32 |
| MODE 3 PACKET LENGTH | 200 μ sec |
| NUMBER OF PACKETS/SLOT | 1030 |
| LENGTH OF TRAINING SEQUENCE | 81 SYMBOLS, 7.36 μ sec |
| NUMBER OF PACKETS/TRAINING SEQUENCE | 10 |
| NUMBER OF PACKETS/ARQ | 100 |
| NUMBER OF TRAINING SEQUENCES/PACKET | 103 |
| TIME REQUIRED TO TRANSMIT VIDEO FRAMES (NO ARQ) | $204.5 + 1.5 + 0.76 = 206.76$ msec |
| ARQ RATE | 9% |
| TIME REQUIRED TO TRANSMIT VIDEO FRAMES WITH ARQ | 225 msec |

FIG. 28

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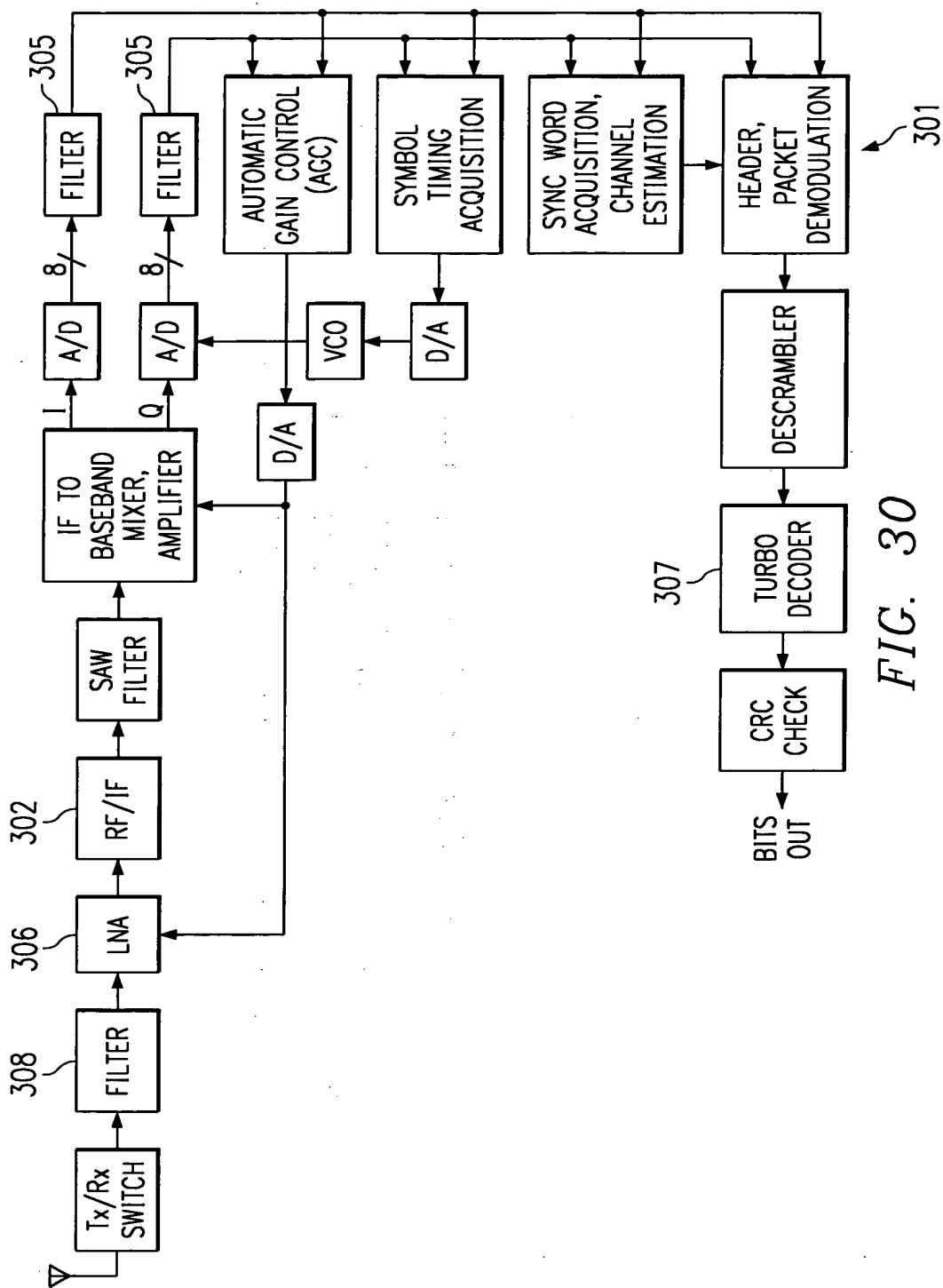
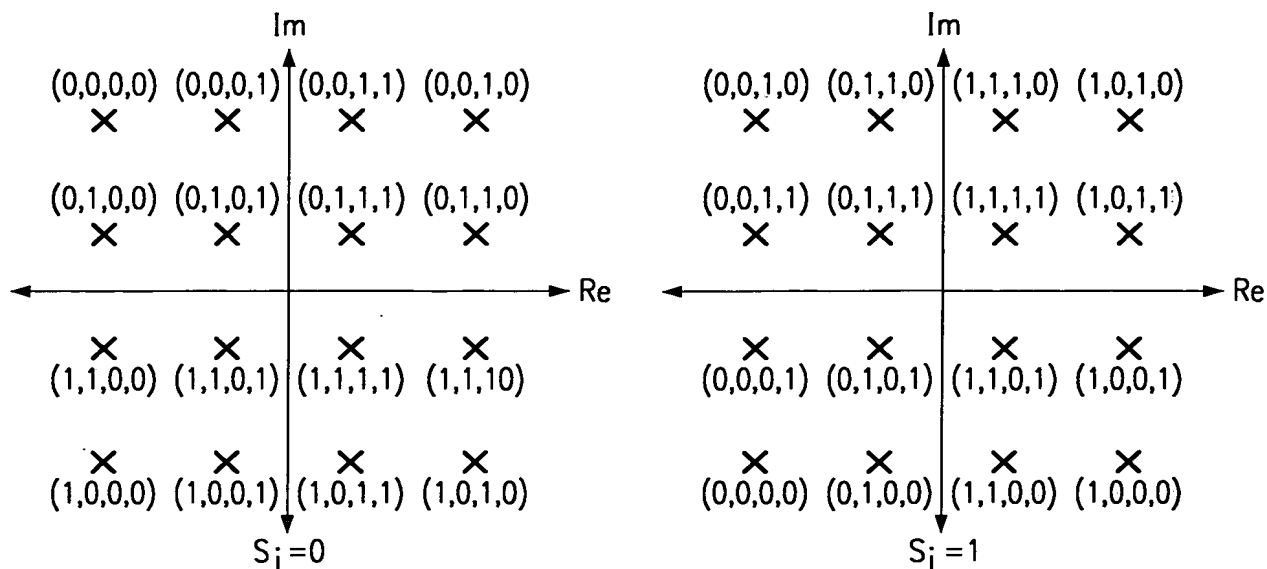
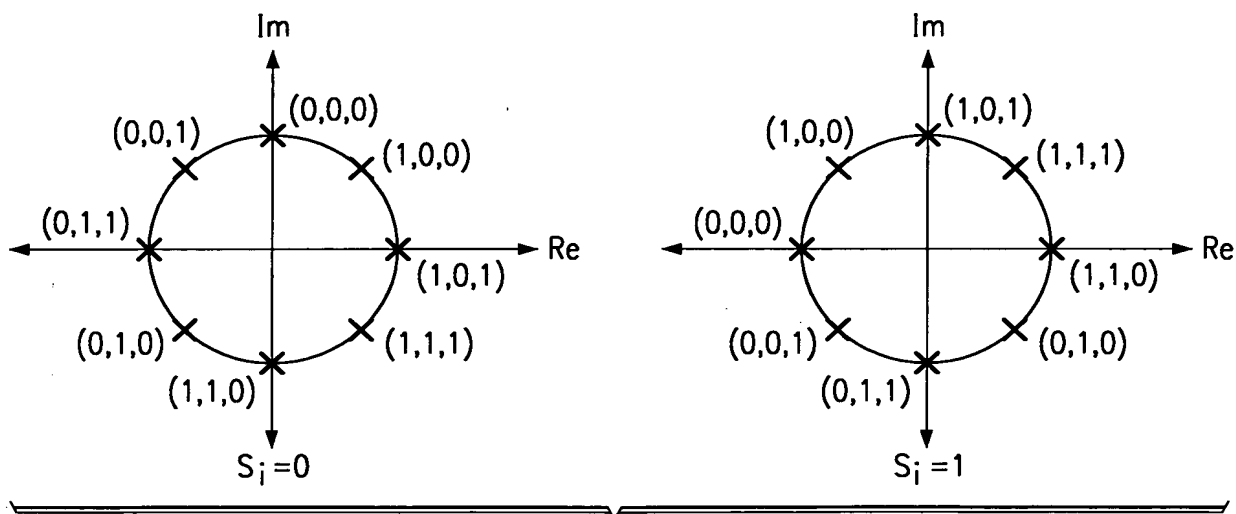
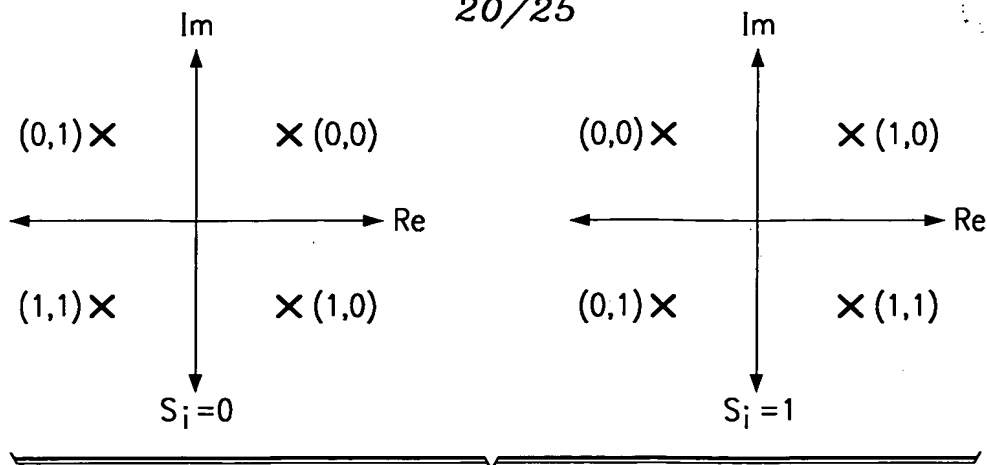


FIG. 30

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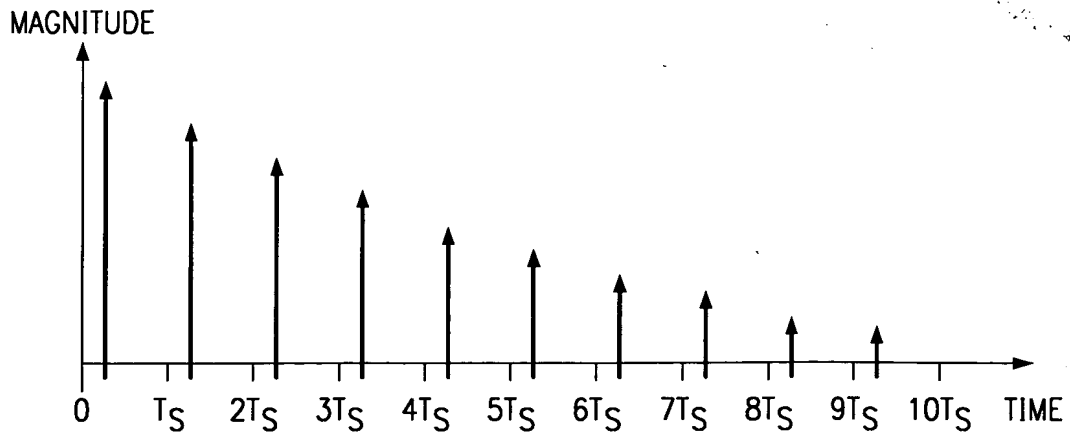


FIG. 34

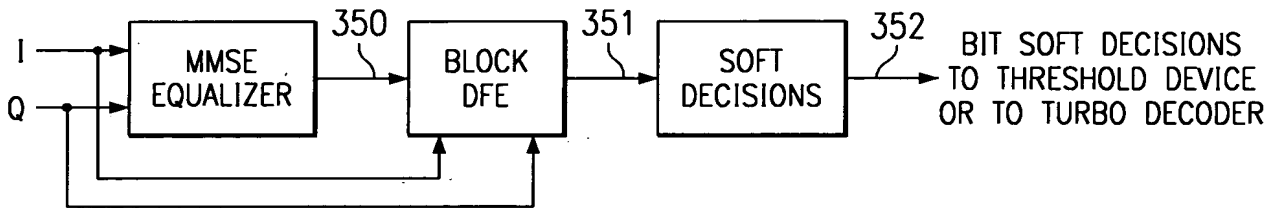


FIG. 35

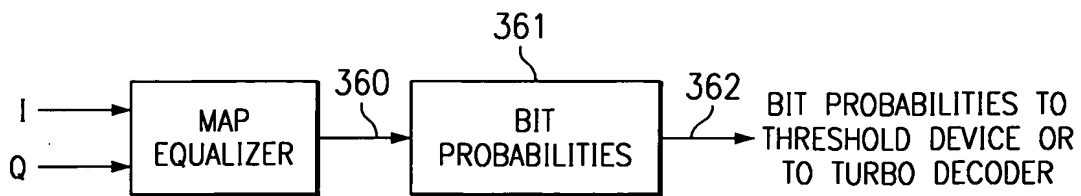


FIG. 36

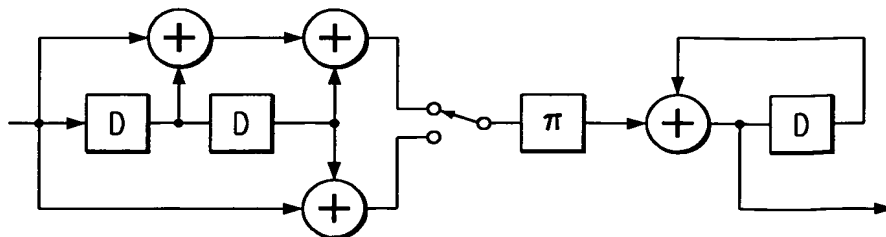


FIG. 37

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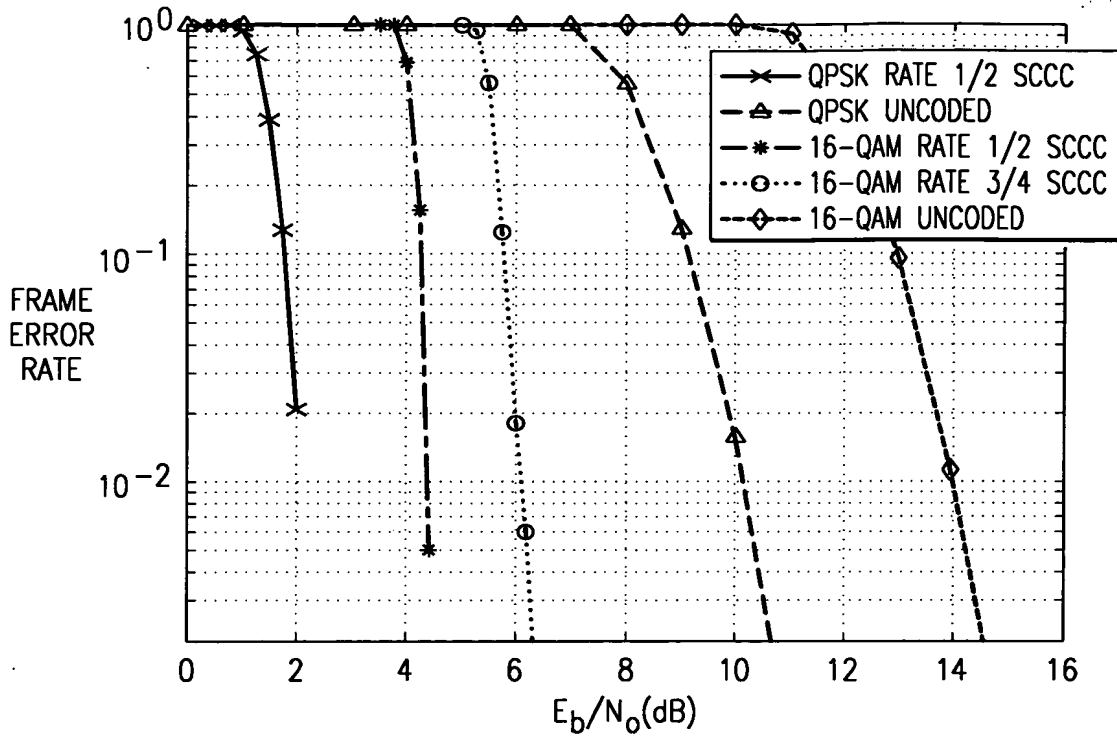


FIG. 38

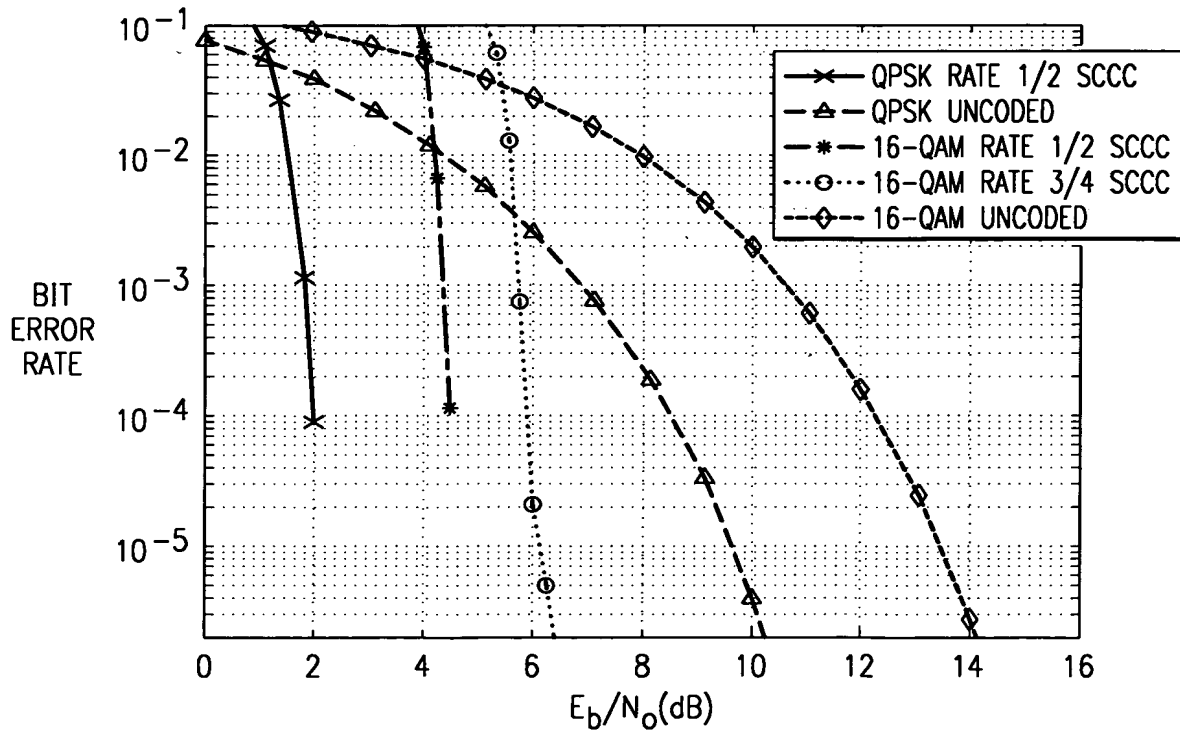


FIG. 39

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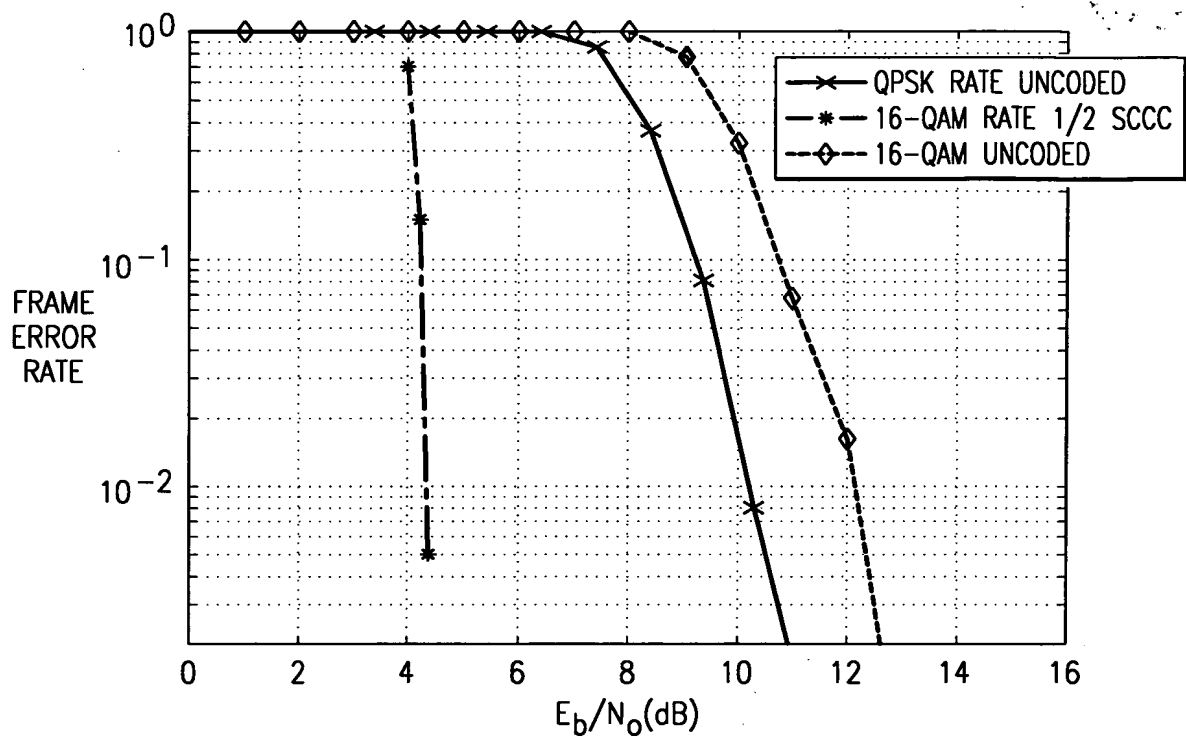


FIG. 40

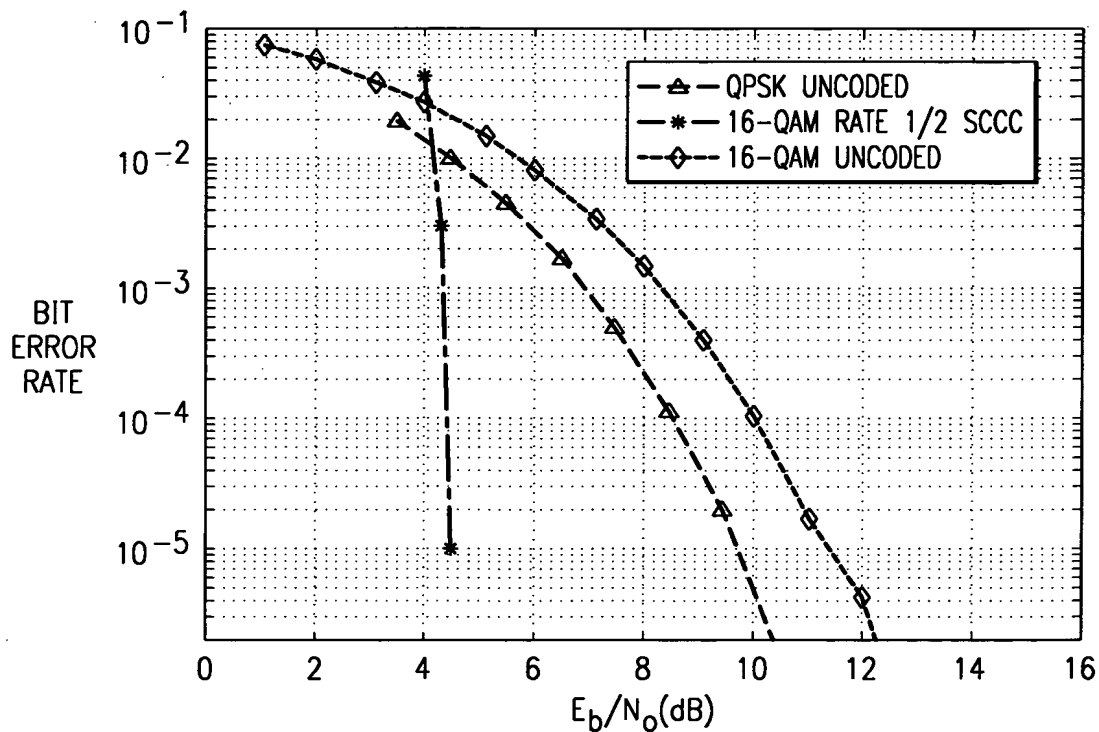


FIG. 41

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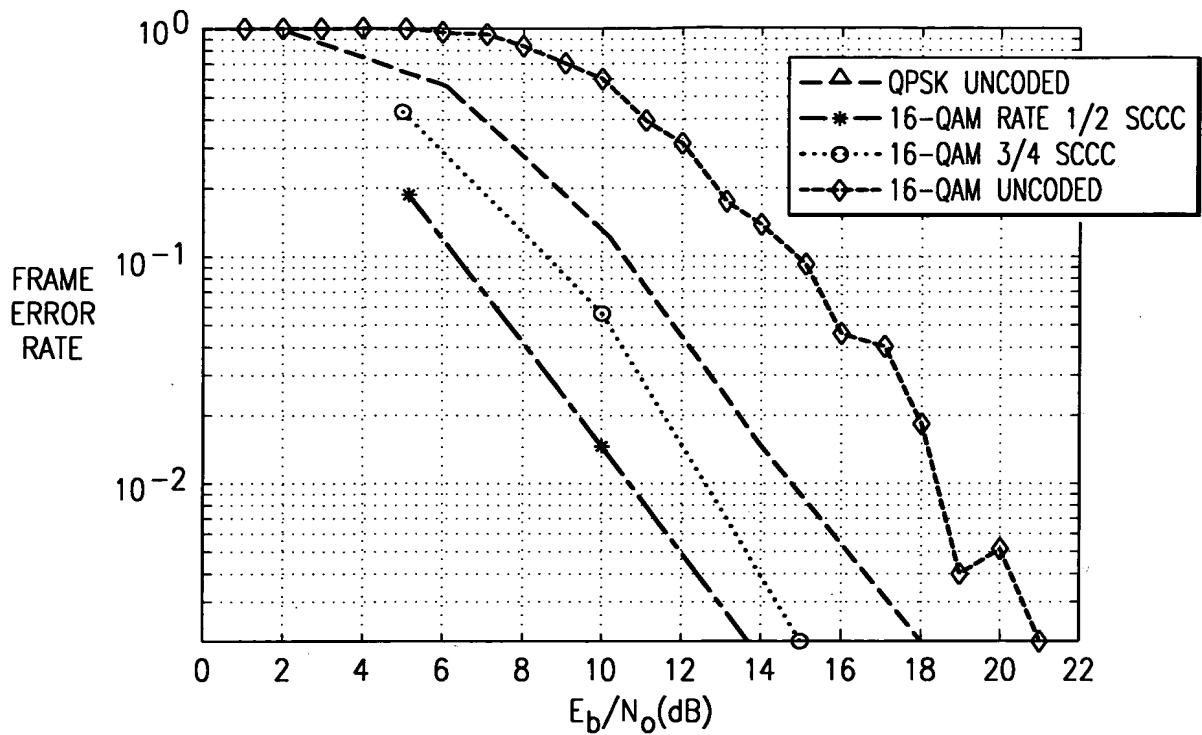


FIG. 42

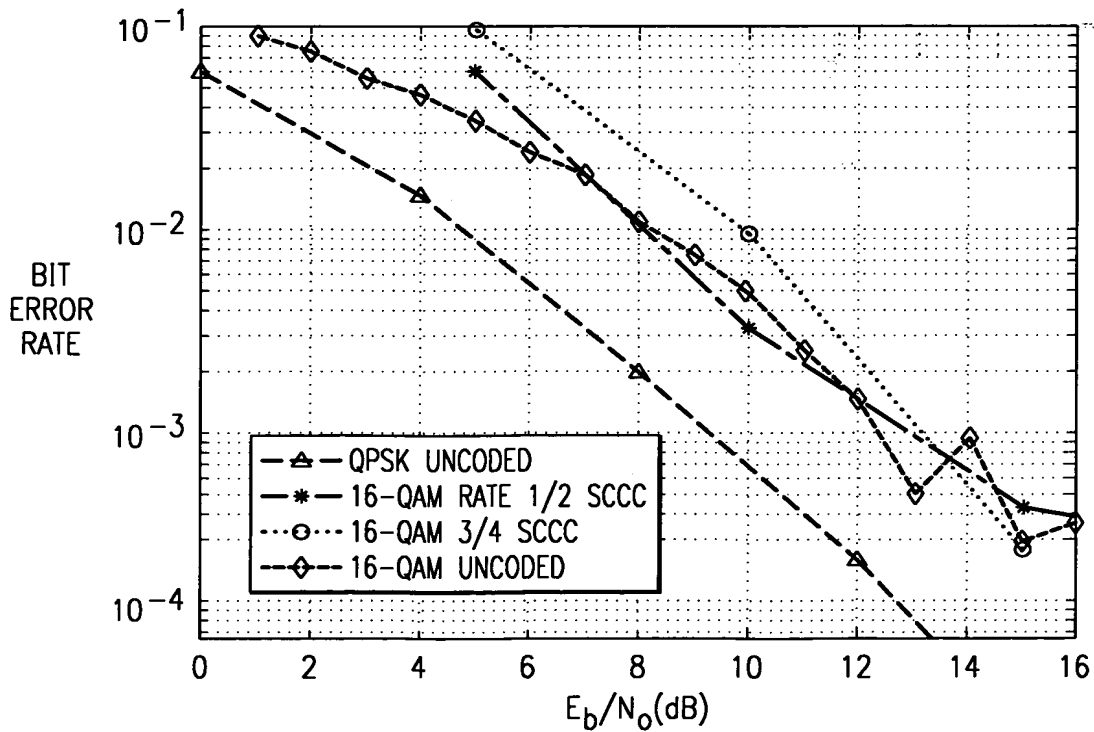


FIG. 43

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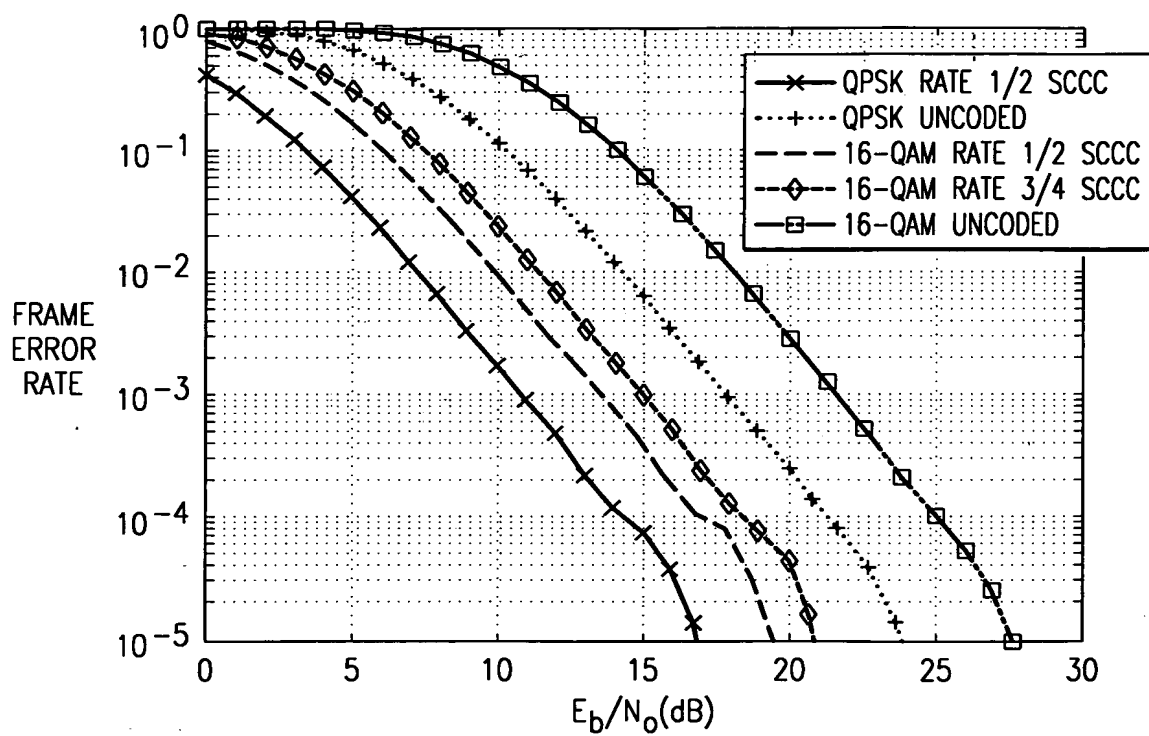


FIG. 44

09777203 042301